11 July 2002 Mission Report

Summary:

The flights today provided Terra validation data and a convection/cirrus anvil case study. The ER-2, Proteus, and WB-57F flew along the Terra ground track at 1215, with the WB-57F sampling a thin, subvisible cirrus layer at about 46 kft over the western ground site. The Citation sampled a mid-level altostratus cloud west of the ground site, and the Twin Otter sampled the lower troposphere over the ground site.

By around noon, a line of convection developed that was aligned NE-SW over the Everglades. After the Terra run, the ER-2 and Proteus flew two legs over this convection line, and the WB-57F was directed to fly in the developing anvil blow-off to the west of this line. Then the remote-sensing aircraft were put on the same line as the WB-57F. Later in the afternoon, the Citation flew along the same line, sampling the lower levels of the anvil line, and the Twin Otter flew along the southwestern end of the ER-2 line for radiation measurements. The P-3 measured the southern end of the convection line, as well as the cirrus sampled by the higher aircraft. Today's flights should provide an excellent case study for modeling and analysis of the physical processes controlling cirrus-anvil evolution.

Forecast:

The surface winds are forecast to be out of the S/SE, and the winds aloft are expected to be northeasterly at about 20 knts. Models differ about where and when convection will occur. Some forecasts suggest that convection along the west coast will be delayed due to maritime clouds over the coast in the morning, but that widespread convection is expected by mid-afternoon. Tropopause at about 48 kft.

Approximate flight times:

	Takeoff	Landing
ER-2	1120	1715
Proteus	1050	1730
WB-57F	1150	1700
Citation	1030, 1400	1315, 1800
Twin Otter	1130	1600

Report:

We had lightning over the airfield in the morning, so fueling the Twin Otter and Citation was delayed. The Twin Otter decided to cancel their early flight and make just one flight, and the Citation cut its first flight to 2 hours 45 minutes so that they could refuel and sample the cirrus anvils in the mid-afternoon. The WB-57F takeoff was delayed about 30 minutes due to a stuck hangar door. The other aircraft took off on schedule.

The ER-2 and Proteus did their 30-minute runs along the Terra ground track, passing over the western ground site at 1215 as planned. The Citation tried to fly over the ground site, but they were vectored off to the west by ATC. They sampled an altostratus cloud at about 19-21 kft, and then managed to get over the ground site at higher altitudes with cirrus above them. The WB-57F got to the ground site just in time for the 1215 satellite overpass, and flew through thin cirrus at about 46 kft. The Twin Otter was sampling the boundary layer during the overpass.

In the early afternoon, a line of convection developed that was aligned NE-SW over the Everglades, with anvils spreading to the west of the line. After the Terra run, the ER-2 and Proteus flew two legs over this convection line, and the WB-57F was directed to fly in the developing anvil blow-off to the west of this line. Then the remote-sensing aircraft were put on the same line as the WB-57F. The WB-57F sampled cirrus at several levels from 41 to 51 kft, with cirrus on legs below about 48 kft.

After the anvils grew longer than about 80 km, the legs were reoriented to be closely aligned to the E-W wind. The WB-57F spiraled through the cirrus layer down to 41 kft, then stepped up through the cirrus. On its second flight, the Citation flew along the same line as the higher aircraft, and sampled cirrus at several levels ranging from cloud base near 29 kft up to 42 kft. Late in its flight, the Twin Otter flew along the southwestern part of this line, making radiometric measurements at about 11 kft. The P-3 flew near the southern end of the convection line for deep convection measurements with ELDORA. Later in the flight, they made measurements of the cirrus layer that the higher aircraft were sampling.